

REMARKS

The present communication is responsive to the Official Action mailed April 5, 2006. A petition for a three-month extension of the term for response to said Official Action, to and including October 5, 2006, is transmitted herewith.

Claims 2-30 and 32-73 are pending in the present application. Claims 3, 15-19, 27, 28, 30, 33, and 44-68 were withdrawn from consideration in response to the restriction requirement of September 14, 2005. Claims 1 and 31 are canceled by the present amendment. New claims 69-73 have been added. No new matter is presented in these claims.

Claims 1-2, 4-14, 20-26, 29, 31-32, and 34-43 stand rejected under 35 U.S.C. § 102(e) as being assertedly anticipated by U.S. Patent No. 6,376,921 to Yoneda et al. ("Yoneda '921"). In making this rejection with respect to claims 1, 2, 31 and 32, the examiner has asserted that Fig. 132A of Yoneda '921 discloses a packaged chip comprising: a chip 311 having front and rear surfaces and contacts 312 on the front surface; a coherent, self-supporting chip carrier attached to the chip 311, the chip carrier including a dielectric layer 317 extending across one surface of the chip 311 and having an inner surface facing upwardly and an outer surface facing downwardly, the chip carrier having conductive traces 3151 thereon electrically connected to the contacts 312 and conductive bumps 315 formed integrally with the traces 3151, the conductive bumps 315 projecting downwardly from the traces, the bumps 315 having bottom ends exposed at the outer surface of the dielectric layer 317 for bonding to contact pads on a circuit panel 250 (Fig. 85), wherein each of the bumps 315 has a first wall portion extending downwardly from one of the traces 3151, a bottom wall portion joining the first wall portion adjacent the bottom end of the bump, and a second wall portion extending

upwardly from the bottom wall portion to the dielectric layer 317.

Referring specifically to claims 4, 5, and 34-36, the examiner asserts that Yoneda '921 further discloses in Fig. 132A that each of the bumps 315 is generally cup-shaped, with a closed end of the cup shape defining the bottom end of the bump and an open end of the cup shape facing upwardly, the cup-shaped bump 315 further has an imperforate sidewall extending upwardly from the bottom end of the bump 315 to the dielectric layer 317. Applicant respectfully traverses this assertion as incorrect. The two-dimensional cross section view of the semiconductor device 310B depicted in Fig. 132A of Yoneda '921 does not give enough detail to disclose a bump in the shape of a cup. Furthermore, the specification of the Yoneda '921 does not describe the metal film 315 (asserted as disclosing a bump) covering the resin projection 318 as being in the shape of a cup. Rather, one of reasonable skill in the art viewing Fig. 132A in light of the accompanying specification, one of reasonable skill in the art would only understand Yoneda '921 to disclose, at best, a U-shaped bump. Claims 4 and 34 clearly recite that at least one bump is cup-shaped, which, as discussed in paragraph 83 of the specification of the present application, implies a hollow structure that is capable of surrounding the tip of the projections during formation of the bumps. Based on this description, it would be understood that the cup-shaped bump has an interior portion defining a cavity. Nothing in the Fig. 132A or the accompanying disclosure of Yoneda '921 teaches or suggests such a structure.

Furthermore, claims 32, 34-43, and 69-73 are directed toward a coherent, self-supporting layer. As discussed in the specification of the present application in paragraph 38, such a structure is one in which the substrate supports the traces and bumps, and holds these elements at least substantially in

position relative to one another while the chip carrier is in existence as an element separate from a chip to which the carrier may be attached in a later stage of manufacture. Stated another way, a coherent, self-supporting chip carrier is an element which can retain its structure and configuration prior to attachment to a chip or other structure. A coherent, self-supporting chip carrier is distinguished, for example, from a structure which is built up upon the surface of a chip, for example by applying a succession of coatings on the chip surface. Independent claims 34 and 69 have been amended to more clearly reflect this structure. The chip structure disclosed in Yoneda '921 is clearly not directed toward a coherent, self-supporting structure. This is reflected throughout the figures and description in Yoneda '921 and with particular reference to Fig. 132A, where the chip structure is described as being made by applying the resin package to the chip, etching the resin package to form the resin bumps 318, and then coating the bumps with metal film 315. (Yoneda '921 col.39, ll.9-20.) As stated above and in the specification of the present application, a chip structure that is made by applying a succession of coatings on the chip surface, as in Yoneda '921, is clearly distinguished from a coherent, self-supporting structure. Accordingly, for this reason alone, claims 32, 34-43, and 69-73 are believed to be allowable over Yoneda '921.

Additionally, referring to claims 22-24, the examiner asserts that Yoneda '921 further discloses in column 38, lines 58-60 that the resin projections 318 can absorb a curvature of the resin package 314 when the device 310B is mounted on a circuit board. The examiner takes the position that such a disclosure means that the bottom ends of the conductive bumps 315 would be movable in a vertical direction or a horizontal direction when the bumps are mounted on a circuit board. Applicant respectfully traverses this argument as

incorrect. While the specification of Yoneda '921 does disclose that the bumps can absorb a curvature of the resin package, it does not state that such absorption is achieved through any movement of the bumps, let alone movement of the bottom ends of the bumps with respect to the chip. For example, it is possible that the absorption to which Yoneda '921 refers is achieved, statically, simply by providing a gap between the bottom surface of the resin package and the top surface of the circuit board into which any irregularity, including curvature, formed in the resin package can extend without interfering with the contact between the metallic film and the corresponding contacts of the circuit board. Yoneda '921 does not teach movement of the bases of the bumps or any aspects of the device which could possibly achieve such movement. Such an ambiguous statement regarding absorption of a curvature of the resin package, absent any specific teaching relating to movement of the bottom ends of the bumps, renders the disclosure of Yoneda '921 inadequate with respect to anticipation of such a limitation, as recited in claims 22-26 and 69-73 of the present application.

Claims 1 and 31 have been canceled, rendering the rejections thereto moot. Additionally, claims 4, 22, and 34 have been rewritten in independent form, including all of the limitation of the former base claims and any intervening claims. New independent claim 69 has also been added and includes the limitations of now canceled claim 31 in addition to the limitation that the bases of the bumps are moveable with respect to the chip. Based on the reasons stated above, claims 4, 21, 34, and 69 are believed to be allowable over Yoneda '921, as Yoneda '921 fails to disclose either that at least one of the bumps is cup shaped or that the bases of the bumps are moveable with respect to the chip. Dependent claims 2, 5-14, 12, 22-26, 29, 32, and 35-43 have been rewritten to depend from either claim 4 or claim 34, and newly-added dependent claims 70-73

depend from claim 69. Therefore dependent claims 2, 5-14, 12, 22-26, 29, 32, 35-43, and 70-73 of the present application are asserted as being allowable at least because they depend from an allowable base claim. Accordingly, applicant respectfully submits that the § 102 rejection of the claims of the present application as being anticipated by Yoneda '921 be withdrawn.

Additionally, the examiner has rejected claims 1, 2, 4-8, 10-14, 29, 31-32, 34-39, and 41-43 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,660,626 to Lin ("Lin '626"). In making this rejection, the examiner asserts that Figs. 1B and 1C of Lin '626 disclose a packaged chip comprising: a chip 110 having front and rear surfaces and contacts 116 on the front surface; a coherent, self-supporting chip carrier attached to the chip 110 and an outer surface 122 facing downwardly away from the chip 110, the chip carrier having conductive traces 136 thereon electrically connected to the contacts 116 (see Fig. 1G) and conductive bumps 138 formed integrally with the traces 136, the conductive bumps 138 projecting downwardly from the traces 136, the bumps having bottom ends 142 exposed at the outer surface of the dielectric layer 126 for bonding to contact pads on PCB circuit panel, wherein the bump 138 has a first wall portion extending downwardly from the trace 136, a bottom wall portion joining the first wall portion adjacent the bottom end 142 of the bump, and a second wall portion extending upwardly from the bottom wall portion to the dielectric layer.

Specific to claims 4-5 and 34-36, the examiner asserts that Lin '626, in Fig. 1C, further discloses that the bump 138 is generally cup-shaped, with a closed end of the cup shape defining the bottom end 142 of the bump and an open end 128 of the cup shape facing upwardly, and that the cup-shaped bump 138 further has an imperforate sidewall extending upwardly from the bottom end 142 of the bump 138 to the dielectric layer 126.

Applicant respectfully traverses this assertion as erroneous. As discussed in paragraph 36 of the present application, the cup-shaped bumps of the present application are hollow shells, capable of surrounding the tips of the projections during formation of the bumps. *Lin* '626 does not disclose bumps that are cup shaped hollow shells, but simply rather solid, unitary structures.

As discussed above, claims 1 and 32 have been cancelled, rendering the § 102 rejections thereto based on *Lin* '626 moot. Further, claims 4 and 34 are believed to be allowable, as *Lin* '626 fails to disclose that at least one of the bumps is cup-shaped. Because claims 4 and 34 have been amended to stand in independent form, including all of the limitations of their former base claims and any intervening claims, applicant asserts that the § 102 rejections made thereto based on *Lin* '626 be withdrawn. Further, applicant respectfully requests that the § 102 rejections based on *Lin* '626 made to claims 5-8, 10-14, 29, 35-39, and 41-43 be withdrawn at least because these claims depend from allowable base claims.

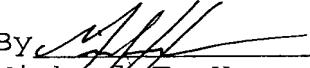
As it is believed that all of the rejections set forth in the Official Action have been fully met by the foregoing amendments and remarks, favorable reconsideration and allowance of all pending claims are earnestly solicited.

If, however, for any reason the Examiner does not believe that such action can be taken at this time, it is respectfully requested that the Examiner telephone applicant's attorney at (908) 654-5000 in order to overcome any additional objections which the Examiner might have.

If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge Deposit Account No. 12-1095 therefor.

Dated: October 5, 2006

Respectfully submitted,

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